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ABSTRACT

The results of a questionnaire returned by 77 foreign graduates of U.S. advanced-degree agricultural programs are discussed. Areas covered included how the graduates felt about their U.S. education, what they are currently doing, and what type of assistance they need in their current jobs. (MLH)

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WHAT FOREIGN GRADUATES THINK ABOUT THEIR U.S. GRADUATE DEGREE PROGRAMS AND EXPERIENCE

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What Foreign Graduates Think About Their U.S. Graduate Degree Programs and Experience

Agricultural Engineering Departments are continually evaluating their graduate programs and policies in an effort to improve them. Through the years we have been deeply involved in educating students from outside the U.S. and in providing educational assistance to many countries. It is recognized that the educational needs of other countries may be quite different than the needs of our own State or Country. Also students coming to the U.S. today may have very different educational objectives than graduate students of five or more years ago. Colleges and universities in developing countries are improving at a very fast rate. Libraries have improved and it seems like in 20 years the number of books and other publications should have grown considerably. Many of these universities are now staffed with professors trained in the U.S. or European countries. Not only have the physical plants in the developing country universities improved, but a few universities should have a reasonably good selection of instrumentation and other necessary equipment to do a reasonably good job of research.

In the past two or three years, the demand for admission to U.S. graduate programs has greatly increased. Michigan State University Agricultural Engineering Department can admit only a fraction of the applicants. A limiting factor is the research supervision necessary and the cost of research programs. Departments desire to maintain a reasonable balance between the number of U.S. and foreign students.

Advanced degree candidates who take four or more years to complete their programs sometimes become very Americanized. These students very

often seek employment in the U.S. and consequently do not contribute to the solution of problems in their countries. Those who do return sometimes have difficulty in re-acclimating themselves to their home environment and consequently it may take several years before they become productive.

In light of the world food situation it behooves us to train as many agricultural engineers as possible, in as short a time as possible so that maximum effort can be focused on increasing the world food production.

For those reasons and others, a questionnaire was designed to try to find out:

1. What our foreign agricultural engineering alumni are doing now that they are back in their own countries?
2. How they feel about their graduate experiences in the U.S.?
3. What are the advantages or disadvantages of doing their graduate thesis research in their own countries?
4. What type of assistance is most needed by our foreign graduates to help them do a better job?
5. Is there a university in their region of the world that might serve as a good center for graduate research?

The names and addresses of 305 foreign graduates were solicited from 27 U.S. Agricultural Engineering Departments. Seventy-seven questionnaires were completed and returned. About 65 were returned because of incorrect addresses. Of those completed, one student earned a B.S., 31 earned an M.S., and 24 earned Ph.D. degrees in agricultural

engineering. Twelve of the respondents earned M.S. degrees in agricultural mechanization. For those who earned more than one degree, only the last degree was counted. Approximately 50 percent of those who responded received their last degree between 1946 and 1969, the other half between 1970 and 1974. The respondents work in 36 different countries. These countries were grouped into seven regions of the world. The table below shows the number in each classification along with the type of position they hold at present.

Region	No. of grads	University work	Government work	Industry
South America	15	9	2	4
Asia	23	11	11	1
Europe	15	7	5	3
Africa	8	4	3	1
Far East	9	5	4	0
Middle East	7	5	2	0
	77	41	27	9

Only 3 of the respondents felt that engineering training was not necessary for their present position.

In an effort to determine how U.S. universities and professors can continue to help their graduates do a better job in their own country, they were asked to respond to the question, "Now that you are back in your own country, what can we do to be of help to you?" The answers were as follows:

1. Over 60 percent of the respondents requested continual information on agricultural engineering research, new developments, new techniques, and any pertinent information to keep them updated. Some of the specific areas mentioned were:

- food engineering
- irrigation and drainage
- library lists and publications
- soil and mechanization
- engineering curriculum and programs
- engineering design information
- new machinery developments
- grain handling systems
- fertilization handling
- rice processing information

2. Over 40 percent of the respondents would like assistance to return to the U.S. for short training programs, meetings, tours, etc., to help keep them abreast of new developments in agricultural engineering. Specific activities mentioned were:

- tours of a short-term nature
- short courses in U.S. to update their knowledge and develop their competences in their particular area of interest
- a program to enable former students to spend sabbatical in U.S. as refresher and to acquire new information
- provide financial support to return to U.S. for additional training

Other items mentioned but less frequently are: donate textbooks to their libraries and departments; more scholarships for graduate work for outstanding students; have agricultural engineers passing through their country stop and give ideas and exchange of information; establish program for foreign graduate students to do research in their own country; develop strong institutional relationship with one or more universities in their country and develop joint research programs on problems relevant to their needs. One respondent wrote "unfortunately, research work is considered as non-essential activity even in institutions of higher education, therefore a good number of trained people capable of doing good research are wasting their talent. A U.S. university association would help activate these people as well as those in decision-making positions". "We need more training in intermediate technology. We need people not only with sophisticated technology but those who know how to bring this technology down to a productive, economic, and practical level." Have U.S. professors visit universities in their countries for various periods of time (1-12 months) to update technology. Make available post-doctoral scholarships for research in their area of interest. Keep lines of communication open between graduates and advisors after graduate has returned to his country. This personal contact is helpful in research activities, teaching, and problem solving, and in collaborative work in areas of mutual interest.

To find out how the foreign student feels about his graduate research experience and what he has done with it since graduation, the following questions were asked:

	Yes	No
a. Have you written an article, bulletin, or other publication on your thesis work for people in your country?	44	29

b.	Do you think your thesis topic was relevant to your country's needs?	56	15
c.	Have you done further work in an area related to your thesis problem since returning to your country?	36	35
d.	Since graduation, have you used any of the instrumentation knowledge or technique that you learned in doing your research?	53	19
e.	Do you look back on your research as a worthwhile and rewarding experience?	70	4
f.	Do you think it would have been better to have done your research in your own country?	25	45

The respondents were asked to list advantages and disadvantages of carrying out their graduate research in their own country. Following is a summary of their responses:

Advantages:

- would have worked on a specific problem relevant to needs of their country
- other people associated with research would have become knowledgeable in the area
- government officials and others in policy-making positions would have been more aware of the problem and the importance of research
- language difficulties would have been minimized
- environmental conditions differ in students' countries and therefore results and research techniques would have been different

- could have had more help in doing their research in their own country
- less expensive
- research would have led to other important related problems

Disadvantages:

- inadequate research facilities
- lack of competent supervision and counsel
- no computer or research instrumentation
- scarcity of supplies and equipment
- lack of current references and other library facilities
- politics and other administrative inadequacies would have influenced research problems as well as methods
- very few people interested in basic research
- in developing countries there is a great lust for power; engineers try to get jobs classified as administration; good engineers are not available for research and there is a lack of motivation for research

The above advantages and disadvantages were mentioned several times by students from all nations including the European countries.

Designing an appropriate graduate-course program for students from other countries sometimes is a problem. Consequently, they were asked to respond to the following question. A summary of their opinions is included.

"Whether a graduate is in research, education, government, business, or in some other occupation he usually finds that certain of his college courses help him in his job better than others. For each of the courses or course areas below please check whether you have found them to be very important, important, or not important. Evaluate only those courses or areas which were included in your graduate program.

	Very Important	Important	Not Important
1. Agricultural Engineering			
a. Power & Machinery	35	9	3
b. Farm Structures & Environment	13	17	7
c. Electrical Power & Processing	24	13	3
d. Food Engineering	14	12	7
e. Soil & Water	22	17	3
f. Other	12	6	0
2. Computer Science	16	23	11
3. Computer-oriented courses	12	17	9
4. Operation Research or Systems Science	19	16	5
5. Agriculture			
a. Agricultural Economics	11	20	1
b. Soil Science	9	22	4
c. Crop Science	11	14	5
d. Animal Science	5	5	10
e. Other	2	2	2
6. Mathematics	24	21	7

	Very Important	Important	Not Important
7. Education	4	15	5
8. Statistics	25	33	3
9. Engineering			
a. Mechanical Engineering	28	13	1
b. Civil Engineering	14	17	5
c. Engineering Mechanics or Science	15	18	4
d. Other	11	4	0
10. Business Courses			
a. Management	15	10	4
b. Marketing	5	13	8
c. Economics	8	15	6

The graduate's evaluation of his course program is indicative of his overall opinion of his graduate experience in a U.S. graduate school. When asked to evaluate how well his graduate program prepared him for work in his country on a scale from 1 to 5, the results were as follows.

Poorly		Good		Excellent
1	2	3	4	5
1	1	27	29	14

Asked about the highlight of their U.S. experience, 22 mentioned that cultural experiences -- traveling, new values -- were the highlight for them. Fourteen said that learning modern methods in their area of specialty was most satisfying, while 11 said the work environment, friendliness, spirit, and enthusiasm of U.S. staff and co-workers was their

most memorable experience. Other things mentioned included completion of degree - 9; quality of staff - 3, beautiful countryside, life on the freeways, ASAE meetings, and Billy Graham.

The universities mentioned most often as potential centers of research training were as follows.

1. Pahlavi University, Iran
2. Universitaria Agraria, Lima, Peru
3. Central University of Venezuela
4. National Taiwan University
5. Indian Institute of Technology, Kharajpur, India
6. Punjab Agricultural University, Ludhiana, India
7. University of Nigeria
8. University of Ile-Ife, Nigeria

Many other departments were mentioned. Most people thought the department where they received their B.S. degree was most acceptable.

Our graduates are making a significant contribution in their countries. The positions they hold are very impressive. The following is a summary of these accomplishments.

1. Member, National Committee on Irrigation Water Management, Bangladesh
2. Developed a new rice production system that is becoming accepted in country
3. Have written papers and spoken extensively on conservation and feedlot mechanization, England

4. First M.S. in Farm Machinery in Chile and also asked by President of Mexico to establish Farm Machinery Department at Escuela Nacional de Agricultura
5. Established first national 5-Year Plan in 1951-52 as chief of agricultural division, India
6. Youngest professor and chairman of Process Engineering, Vice-president of ISAE, best paper commendations in 1973 from Institution of Engineering, India
7. Dean of Engineering and received award from ISAE, India
8. Accomplished 24 dairy projects and increased dairy production from 10 million to 1,000 million, India
9. Made improvements to rice milling methods in India
10. Project leader for program to develop new agricultural machines for developing countries; over 1,500 machines produced
11. Currently establishing Agricultural Engineering Department plus have developed full mechanization of ground-nuts and partial mechanization of cotton, Sudan
12. Head of Faculty Planning Office
13. Countless numbers of educators that work towards dispersing their knowledge, developing other's abilities, and encouraging the refinement and modification of scientific methods. To the many who responded modestly, your human triumphs occur through those you inspire to reach beyond our human barriers

More than 85 percent of the respondents felt that their undergraduate courses in mathematics, basic engineering, agriculture, and other areas prepared them very well for graduate work in the U.S.

Summarizing generally, our graduate alumni indicated that they are happy with their U.S. educational experiences. They feel that they were adequately trained theoretically but in general would have liked a few more applied courses. Over 94 percent said that their research experience in the U.S. was a worthwhile and rewarding one. Seventy out of 72 indicated that their graduate work prepared them very adequately for work in their own countries.